



Do patients requiring a multivisceral resection for rectal cancer have worse oncologic outcomes than patients undergoing only abdominoperineal resection?☆



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ARTICLE INFO

Article history:

Received 4 October 2016

Received in revised form

27 May 2017

Accepted 28 May 2017

Keywords:

Rectal cancer

Colorectal surgery

ABSTRACT

Introduction: Abdominoperineal Resection (APR) remains an important option for patients with advanced rectal cancer though some may require multivisceral resection (MVR) in addition to APR. We hypothesized that oncological outcomes would be worse with MVR.

Methods: A retrospective review from 2006 to 2015 of 161 patients undergoing APR or MVR for rectal cancer, of whom 118 underwent curative APR or APR with MVR. Perioperative, oncologic and survival metrics were evaluated.

Results: There were 82 patients who underwent APR and 36 who underwent MVR. Surgical approach and incidence of complications were similar (All $P > 0.05$). There was 1 local recurrence in each of the APR and MVR groups at a mean follow-up of 34 and 32 months, respectively. Distant recurrences occurred in 3 APR patients and 4 MVR patients.

Conclusions: APR and APR with MVR can be performed with comparable morbidity and oncologic outcomes.

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1. Introduction

Rectal cancer represents a significant disease burden with nearly 40,000 diagnoses in 2015.^{1,2} Over the past two decades, rectal cancer therapy has made significant oncologic advancements with the development of the total mesorectal excision (TME) and chemoradiation protocols, as well as reduced surgical morbidity with minimally invasive approaches.^{3–8} Additionally, improved imaging modalities have led to better pre-operative planning, and helped to determine who is potentially resectable for cure and who is not.⁹ Of the surgical resections in the armament of the colorectal surgeon, abdominoperineal resection (APR) is a major operation,

completely excising the distal colon, rectum and anal sphincter complex utilizing both an abdominal and perineal approach that is reserved for patients with locally advanced and distal rectal cancers.¹⁰ While the APR itself carries a significant risk of morbidity and mortality, when performed properly in select patients, the risk for local recurrence is relatively low.^{11,12}

Approximately 10–18% of all rectal cancer cases have been described as adhering to or invading surrounding organs.^{13–15} The biology of these tumors and their potential infiltration of adjacent structures results in a higher risk to develop a local recurrence.¹³ For these locally advanced rectal cancer cases, a complete *en bloc* multivisceral resection (MVR) provides the best chance of cure.^{16,17} A successful, curative resection can result in tremendous improvement in local recurrence rates and survival.^{18–20} However, these resections are technically difficult and associated with significant morbidity and mortality. An estimate suggests that only one-third of patients with locally advanced rectal cancer receive the appropriate *en bloc* MVR likely due to perceived morbidity of the procedure as well as physician inexperience and patient reluctance.¹⁸

☆ Poster Presentation, Digestive Disease Week, May 22, 2016, San Diego, CA.

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Despite its relatively common use, there is little literature describing the outcomes of MVR in addition to an APR. The aim of the present study was to compare the outcomes of those patients with rectal cancer who underwent APR alone, versus those who required an MVR for potential curative operation. Due to the technical difficulty and aggressive biology of the infiltrating tumor, we hypothesized that oncologic outcomes would be worse with MVR.

2. Materials and methods

After obtaining Institutional Review Board approval, patients who underwent curative RO APR for rectal adenocarcinoma from 2006 to 2015 at University Hospitals Cleveland Medical Center were retrospectively evaluated. Patient information collected included demographics, co-morbidities, and preoperative imaging modality. Perioperative data collected included surgical approach, indication for conversion if applicable, intra-operative characteristics, operative time, and wound classification. Post-operative data collected included length of stay (LOS), surgical complications and mortality. Oncologic data collected included adjuvant and neoadjuvant therapies, tumor size, pathologic margins, patient follow up and recurrence. A negative circumferential resection margin (CRM) was defined as 1 mm or greater on final pathology as has been used in recent rectal cancer trials.^{21,22}

The primary outcome for this study was incidence of local recurrence and overall survival (OS). Secondary outcomes included pathological margins, incidence of distant recurrence, overall disease-free survival (DFS) as well as perioperative variables (e.g., operative time, EBL, length of stay), and postoperative complications within 30 days.

2.1. Operative details

The surgical resections were classified as either APR alone or APR with MVR. An extra-levator APR approach was utilized for low rectal tumors requiring APR, or when there was involvement of the sphincters, levators, or concern for a positive circumferential resection margin (CRM). MVR was defined by partial or total prostatectomy, cystectomy, hysterectomy, vaginectomy, coccygectomy, or partial small bowel resection (when adherent to an adjacent pelvic structure) in addition to the APR. The perineal closure method (primary closure vs. myocutaneous flap) was chosen at the discretion of the attending surgeon. Absorbable suture was used to close the ischioanal and subcutaneous tissue and the skin was closed with long-term absorbable vertical mattress sutures. Flap reconstruction was reserved for irradiated patients undergoing significant perineal skin excision.

2.2. Statistical analysis

The program R was utilized for statistical calculations (R Foundation for Statistical Computing, Vienna, Austria). Categorical variables were reported as frequencies and percentages. Continuous variables are reported as means with standard deviations. Local recurrence-free survival, DFS and OS was estimated using Kaplan-Meier analysis. Hazard ratios were calculated with Cox proportional hazard regression. A P-value less than 0.05 was considered significant.

3. Results

A total of 161 patients underwent an APR for primary or recurrent rectal cancer from 2006 to 2015 (Table 1). Of these 161

patients, 118 (73%) were RO APRs. This was further divided into 82 patients who underwent APR alone and 36 patients who underwent APR with MVR (herein referred to as “MVR”). In the APR group, 71% (n = 58) of the patients were male, while 41% (n = 15) were in the MVR group (P = 0.004). Mean BMI was 29 ± 7 kg/m² in the APR group and 27 ± 5 kg/m² in the MVR group (P = 0.04). Patients with a history of smoking represented 52% (n = 43) of the APR group and 47% (n = 17) of the MVR group (P = 0.69). Pre-operative pelvic imaging with Magnetic Resonance Imaging (MRI) was performed in 62% (n = 52) of APR patients and 64% (n = 24) of MVR patients (P = 0.84) while Computed Tomography (CT) scans were performed for pelvic imaging prior to the adoption of routine high resolution MRI use in 37% (n = 30) of the APR patients and 37% (n = 12) of the MVR patients (p = 0.84). Neoadjuvant radiation was given to 93% (n = 76) of APR patients and 92% (n = 33) of MVR patients (P = 1.0). Overall, 90% (n = 74) of patients in the APR group and 92% (n = 33) in the MVR group received neoadjuvant chemotherapy (P = 0.27).

An open surgical approach was utilized in 52% (n = 43) of the APR patients and 75% (n = 27) of the MVR cases, which was significantly different (P = 0.03) (Table 2). The rate of conversion from laparoscopy to open was 17% (8/47) in the APR group and 25% (3/12) in the MVR group (P = 0.68). Mean operative time was significantly longer at 256 ± 103 min for APR cases versus 333 ± 115 min for MVR cases (P = 0.004). Mean blood loss was also significantly different: 206 ± 479 mL in the APR group and 549 ± 653 mL in the MVR group (P = 0.009). In the APR group, 4% (n = 3) of patients underwent a concomitant myocutaneous flap for perineal reconstruction, while in the MVR group, 8% (n = 3) of patients had a myocutaneous flap (P = 0.34). In the MVR group, 6% (n = 2) of the patients underwent a partial small bowel resection, 33% (n = 12) cystectomy and 8% (n = 3) coccygectomy. Of the 21 female MVR patients, 86% (n = 18) underwent vaginectomy and 24% (n = 5) total hysterectomy and bilateral salpingo-oophorectomy. For the 15 male patients, 73% (n = 11) underwent prostatectomy. Three patients in the MVR group underwent intra-operative radiation therapy compared to 0 in the APR group (P = 0.03).

The incidence of abdominal wound complications was 10% (n = 8) in the APR group and 8% (n = 3) in the MVR group (P = 0.37) (Table 3). Perineal wound complications occurred in 4% (n = 3) of APR patients and 8% (n = 3) of MVR patients (P = 1.0) and there were no perineal wound complications in patients who underwent perineal reconstruction with a myocutaneous flap. Urinary tract infections occurred in 4% (n = 3) of APR patients and 8% (n = 3) of

Table 1
Patient characteristics.

	APR (N = 82)	MVR (N = 36)	P-value
Age, mean (SD)	65 (±12)	66 (±10)	0.53
Male	58 (71%)	15 (42%)	0.004*
BMI, mean (SD)	29 (±7)	27 (±5)	0.04*
Smoking	43 (52%)	17 (47%)	0.69
DM	20 (24%)	4 (11%)	0.14
COPD	6 (7%)	1 (3%)	0.67
Preoperative Imaging Modality			
MRI	52 (63%)	24 (67%)	0.84
CT	30 (37%)	12 (33%)	
Neoadjuvant Radiation	76 (93%)	33 (92%)	1
Neoadjuvant Chemotherapy	74 (90%)	35 (97%)	0.27

APR, Abdominoperineal resection; MVR, Multi-visceral resection; SD, standard deviation, BMI, body mass index in kg/m²; DM, diabetes mellitus; COPD, chronic obstructive pulmonary disease; MRI, magnetic resonance imaging; CT, computed tomography.

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